

aneus, as in the other experiments. From the cystic bile of three of them the bacillus pyocyaneus was recovered twice in association with the colon bacillus and once with an unidentified aerobic bacillus.

The presence of the bacillus pyocyaneus in the cystic bile can be explained only by assuming that the organisms passed from the intestine either into the portal or general circulations and were excreted by the liver. These experiments eliminate with certainty the possibility of ascending infection in the bile ducts.

There are still other points which favor the view that micro-organisms are sometimes excreted by the liver into the bile. The gall-bladder in typhoid fever, for example, frequently contains the typhoid bacillus in pure culture. Chiari⁵⁰ found it post-mortem nineteen times out of twenty-two in the bile. If the infection were an ascending one from the intestine we should expect the frequent presence of some of the bacteria normally present there.

The possibility of infection of the gall-bladder from the general circulation has already been shown by the experimental work of Blackstein,⁵¹ Fütterer,⁵² and others who found that the intravenous injection of bacteria is often followed by their appearance in the bile. We have confirmed these observations in a number of instances. Furthermore, Cushing⁵³ obtained biliary calculi after intravenous inoculation of rabbits with the bacillus typhosus.

Direct infection of the gall-bladder from the peritoneum has not been especially considered by previous writers, since infections from this source would have little bearing on the etiology of the cholecystitis of gall-stones. From a number of observations on cases of experimental peritonitis we are convinced, however, that the cystic bile may occasionally be infected from the peritoneal cavity.

Reviewing the investigations of others and the experiments recorded in this paper, it is evident that there are four paths by which micro-organisms may gain access to the gall-bladder: first, from the intestine through the common and cystic ducts; second, from the intestine through the portal circulation; third, from the general circulation; fourth, directly through the walls of the gall-bladder from the peritoneal cavity. Direct infection from the peritoneal cavity or the general circulation is probably infrequent. We further believe that in the cholecystitis of gall-stones the infection takes place much more frequently through the portal system than through other channels, and that the importance of ascending duct infections has heretofore been greatly overestimated.

⁵⁰ Chiari: *Über Vorkommen von Typhusbacillen in der Gallenblase bei Typhus Abdominalis*. Ztsch. f. Heilkunde, Bd., XV, 1894.

⁵¹ Blackstein: Loc. cit.

⁵² Fütterer: Loc. cit.

⁵³ Cushing: Loc. cit.

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(See *Collier's Weekly*, Nov. 4, 1905.)

THE RADICAL CURE OF UMBILICAL HERNIA.*

By A. W. MORTON, M. D., San Francisco.

UMBILICAL hernia is of very common occurrence during the first year of life, being a little more frequent in the female child than in the male. In adult life, according to Berger, it is much more frequent in the female, 22.16% to 2.5% in males. Umbilical hernia in adults is nearly always acquired, and seldom seen before the twentieth year. It generally occurs in obese women and men; but usually in women who have born a number of children. The obesity favors a weakened condition in the structures about the umbilical ring; this location is also favored on account of the ring and the tendency for separation of the rectus muscles above it. The exciting causes are any strains which bring intraabdominal pressure, as lifting, coughing, and straining as in childbirth.

The hernia is usually about the size of a closed fist, and contains attached omentum, and is some-

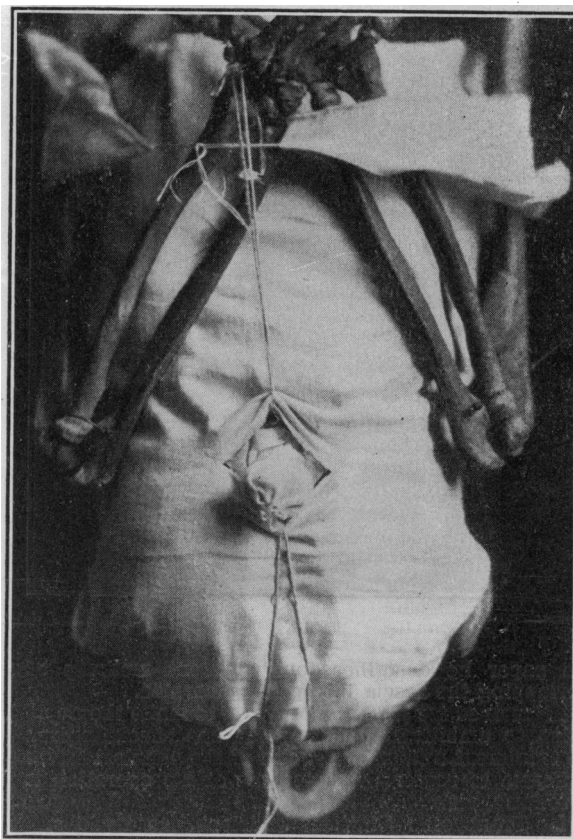


FIG. 1.

times very large, and may contain much of the intestinal tract and other organs. The covering of the hernia is very thin, consisting of peritoneum, fascia and skin which has lost much of its strength from over-distention, and there is a tendency to ulceration.

The infantile form generally recovers without any surgical procedure. The surgical treatment of umbilical hernia has been very unsatisfactory in the past; most of the text-books rather advise against the operation; Warren & Gould² say, "In the majority of umbilical hernias, operation is not to be advised," the authors say, "Twelve relapses out of twenty-one cases traced." Wharton & Curtis³ say, "The operation for umbilical hernia is rather unsatisfactory because of the difficulty in bringing the edges of the umbilical ring in contact, on account of the great abdominal

* Read at the Thirty-fifth Annual Meeting of the State Society Riverside, April 1905.

tension." "Relapses are very frequent after these operations."

The ordinary text-book method is to expose the hernia by a longitudinal incision. After reducing the hernia or removing it, should it be omentum, they close the peritoneum, as in any ordinary abdominal operation; and the fascia is then brought together. Often it is impossible to use the above method successfully.

The overlapping method of repairing hernia which has solved the problem, was first brought to our attention by Dr. E. Wyllys Andrews of Chicago, as early as 1895,⁴ in an article entitled, "Imbrication or Lap Joint Method, a Plastic Operation for Hernia." In

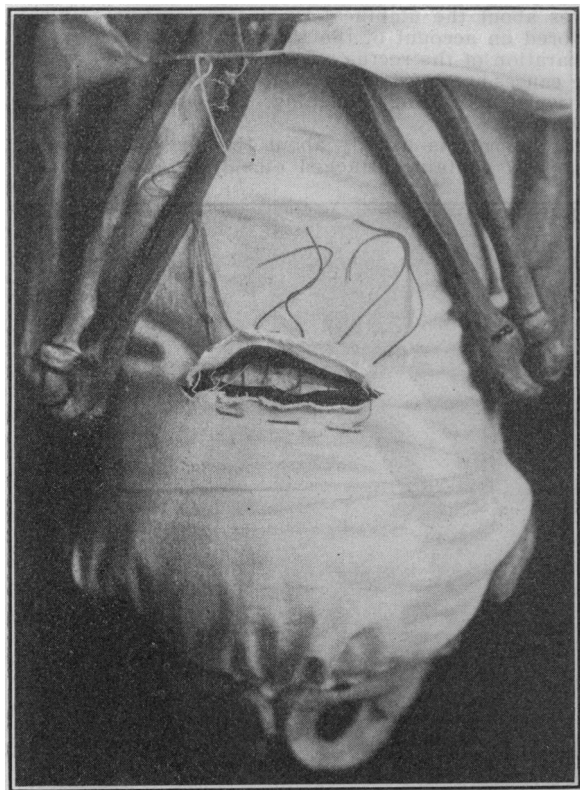


FIG. 2.

this paper he describes four different methods of overlapping the fascia in repairing hernias.

It remained for Dr. Wm. Mayo⁵ to make the application to umbilical hernia, which has revolutionized the treatment and makes it one of the simplest forms of hernia to repair. The technic of his operation is as follows, viz.:

"1. Transverse elliptical incisions are made surrounding the umbilicus and hernia; this is deepened to the base of the hernial protrusion.

2. The surfaces of the aponeurotic structures are carefully cleared two and a half to three inches in all directions from the neck of the sac.

3. The fibrous and peritoneal coverings of the hernia are divided in a circular manner at the neck, exposing its contents. If intestinal viscera are present, the adhesions are separated and restitution made. The contained omentum is ligated and removed with the entire sac of the hernia and without tedious dissection of the adherent portion of omentum.

4. An incision is made through the aponeurotic and peritoneal structures of the ring extending one inch or less transversely to each side, and the peritoneum is separated from the under surface of the upper of the two flaps thus formed.

5. Beginning from two or two and one-half inches above the margin of the upper flap, three to four

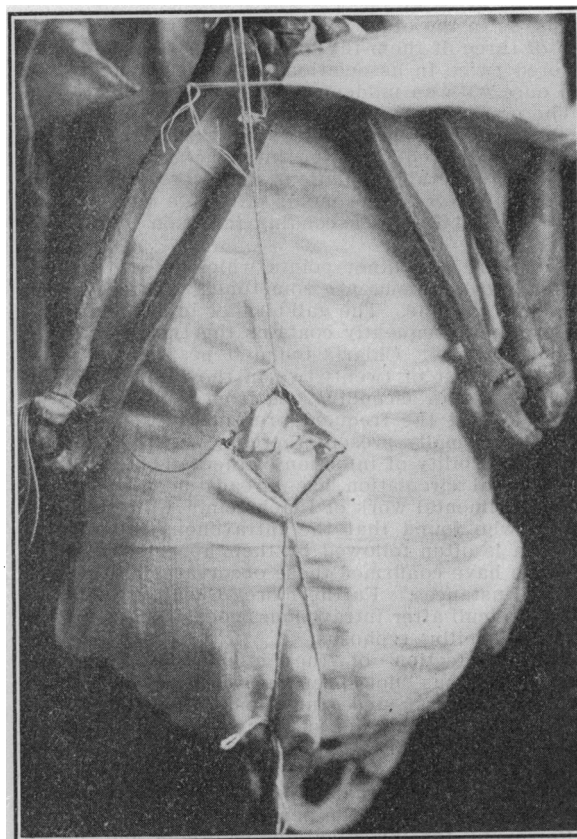


FIG. 3.



FIG. 4.

mattress sutures of silk or other permanent material are introduced, the loop firmly grasping the upper margin of the lower flap; sufficient traction is made on these sutures to enable peritoneal approximation with running suture of catgut. The mattress sutures are then drawn into position, sliding the entire lower flap into the pocket previously formed between the aponeurosis and the peritoneum above.

6. The free margin of the upper flap is fixed by catgut sutures to the surface of the aponeurosis below, and the superficial incision closed in the usual manner. In the larger herniæ the incision through the fibrous covering of the sac may be made somewhat above the base, thereby increasing the amount of tissue to be used in the overlapping process.*

In performing the operation by overlapping from above downward I have always found it free from tension, which is very essential in obtaining primary union, and it also gives very much more space for respiration which is more or less impeded by the lateral closure. It makes a stronger union than an edge approximation.

I have used the above method in 5 cases, except I always use kangaroo tendon or chromic catgut instead of a non-absorbable suture. In two of the cases I made only one transverse elliptical incision, so that the umbilicus was not removed; this can readily be retained in small hernias, if so desired. The 5 patients have made complete recoveries, without any relapses.

I believe there are no more objections to the performance of this operation for umbilical hernia than to the operation for any other form of hernia, and there should be as great a percentage of recoveries in the same class of patients. Mayo reports 25 operations overlapping from above downward, no deaths or recurrences.

DISCUSSION.

Dr. Emmett Rixford: The Mayo operation for umbilical hernia is a great practical advance on any procedure previously suggested in these cases. In my hands it has proven of the greatest value. Mention has been made of the fact that Andrews of Chicago deserves priority for the use of what he calls "imbrication" in inguinal hernia, and another has referred to the operation of Lucas Championnier in which a sort of "imbrication" is used. As I understand the operation of Mayo, the only claim made as to originality is for a rotation of 90°, i. e., Mayo makes a transverse suture line, thereby shortening the sagittal semi-circumference of the abdomen instead of the transverse or horizontal. And just here is a very important consideration, the abdominal wall is shortened by the operation in exactly the direction in which it is pathologically lengthened, and the direction in which it can be shortened without embarrassing the respiration.

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1. Berger, *Traité de Chirurgie*, Tome VI, page 321.
2. Warren & Gould, text 1902.
3. Wharton & Curtis, text 1902.
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5. Report section of Surgery, A. M. A., 1903, page 187.
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FURTHER DATA UPON THE CHEST SHAPE IN TUBERCULOSIS.*

By WOODS HUTCHINSON, M. D., Redlands.

SINCE my attention was first directed to this question by some measurements which I made of tuberculous chests nine years ago, a number of additional data have been collected, some by myself, but more by observers on both sides of the Atlantic whose interest was aroused by the publication of my results in the *British Medical Journal* in 1900. These measurements now number some 700 and support with singular closeness and unanimity substantially the same conclusions as my first series of 40 measurements; that is, that the tuberculous chest is not flat,

as at first glance it appears, and as most text-books yet describe it, but *round*, and instead of its antero-posterior diameter being diminished, this is normal, or slightly increased, while the shrinkage has occurred in the transverse diameter.

In order to express the relations of the two diameters of the chest, it was necessary to devise a chest index based upon the same principle as the familiar cranial index, and to determine what this index was first of all in normal individuals.

My first measurements indicated a normal index of 72, but I have since then succeeded in accumulating a series of tables of nearly 5000 measurements of normal individuals, chiefly soldiers in garrisons and college students and athletes in gymnasia, and upon this larger mass the average index is slightly lowered, namely, 70. The measurements of the 700 consumptive chests show an average index of 78, and with the exception of one markedly aberrant series, the other 11 averages, range within one point of 80, either above or below, thus making the consumptive chest 10 degrees rounder than the normal. As these 700 measurements have been taken in three different London hospitals, Leeds, England, in New York, in Chicago, in Buffalo, in Portland, Ore., in San Francisco, and in Memphis, Tenn., they may be regarded as fairly well establishing an average in this disease. This shape of chest is, of course, the persistence of the child chest, and represents an arrested development at about the proportions, normal at the 12th to the 15th year. As is well known, the fetus has a chest deeper than its width, the infant at birth has an almost circular chest, index from 95 to 100; by 5 years this has flattened to 90 degrees and by 12 years to 80 degrees. This also represents an evolution from the ancestral quadrupedal chest, which in all mammals outside of the human species, except the anthropoid apes, some of the bats and some whales, is much deeper than it is wide. A similar form of chest has also been found by Drs. Evans and McHugh, of Chicago, among the paupers in Cook County Hospital, and by Arthur McGugan among the chronic insane, thus making it probable that it is the type of chest associated with arrested and imperfect development, or as we loosely term it, "degeneracy."

Of this series of cases some 70 were measured in a very early stage of the disease, and these show an index within one point of as high as the rest of the series, thus making it highly probable that this type of chest precedes the disease, although it is probably exaggerated by the increased respiratory effort and interference with proper emptying of the lungs due to the lesions of the disease.

Another straw pointing in the same direction is the fact that of 31 successive cases of phthisis in my own practice, the 16 patients who did badly (6 of them dying) presented an average index of 80.2, while the 15 who did well (4 of them making complete apparent recovery) showed an average index of 74.6.

As only 15 per cent of the tuberculous patients measured failed to show a higher index than the normal, it would thus appear as if the measurements of the chest would furnish a datum of considerable value in the diagnosis of tuberculosis, and that any child or young adult presenting a higher chest index than normal, for their age ought to be given a vigorous open air life with abundance of nutritious food and every measure taken which would promote normal development and the attainment of full vigor.

An exaggeration of this type of chest, due to the lateral pull of the diaphragm gives rise to the pigeon breast of rachitis and pharyngeal adenoids.

The round, long chest and small heart of puberty form the physical basis of the *habitus phthisicalis*.

To obtain the best results in cases of Colles's fracture the patient should be placed under an anesthetic during reduction.—*International Journal of Surgery*.

*Abstract of a paper read before the San Bernardino Medical Society, November 8, 1905.